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ABSTRACT

The dual job training system in Germany is an essential market parameter of the country's economy and a part of the country's growth policy. By improving human capital (by providing training in high-tech sectors) it will also help safeguard Germany's future as a major industrial nation. Training primarily takes place in handicraft and industrial enterprises and forms an integral part of the labor market and its regulatory instruments. Major characteristics of the dual system include the following: (1) reduced specialization by a broadly based basic education, providing a base for technical training; (2) practice-oriented training and integrated theory, with the responsibility borne by industry and trade, the state, and trade unions; (3) training directed at acquiring key qualifications through key contents, thus providing an adequate means of mastering structural changes; (4) a standardized system with well-defined levels; and (5) a planned transition of youth from schools providing a general education to the training and employment system and vice versa. To keep current, the training system will have to change training methods and methods of teaching continually. The future of the system will depend partly on its costs and the value that the country puts on its cost-benefit ratio. (11 references) (KC)

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The German Dual System of Vocational Education and Implications for Human Resource Development in America

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1. Introduction

The dual system of vocational education takes because of the specific linkage it provides between theory and practice an eminent position within the educational and vocational system in the Federal Republic of Germany. But it also meets with international recognition, which is, however, not limited to the system as such, but also refers to what German skilled labour performed before World War II and has performed since then. It refers in particular to human skills as reflected by the quality of the products. After all, this is a major asset for an exporting nation like Germany. All this may suggest the conclusion "introduce this qualification system and get as a logical consequence the German prosperity that immediately goes along with the German competitive strength in the international market place".

When starting from the MIT report, however, and comparing the productivity of European car manufacturers with that of their Japanese counterparts, this conclusion cannot be maintained (Womack, Jones, Roos 1992). The Japanese approach to vocational training would, on the contrary, have to be given priority. It should, on the other hand, be noted in this context that the educational and vocational system established in a particular country has a cultural background. To understand an educational and vocational system hence also means to understand its cultural interrelationship with the philosophical, spiritual and humanistic tradition of that country. Consideration must, however, also be given to the way in which this system can contribute to the development of a country's human resources.

2. Educational and vocational system

The qualification system in the Federal Republic of Germany distinguishes between education and training. The educational side is covered by schools imparting general knowledge or, in vocational training, by subjects based on general knowledge. This concept starts from the premise that next to imparting cultural skills and preparing for the current and future conditions of life, it is the development of a human being trained against the background of classical ideals that is at the centre of all education. Educating people hence mainly is a question of dealing with and developing patterns of action that will help master life as such. A qualification for a future professional life is not the immediate objective.

Training, on the other hand, prepares on a number of different levels for specific trades. Though not consistent with the comprehensive concept of education of the Enlightenment, this more formal division within the educational system offer the possibility of progressing to higher levels since final examinations always include the aspect of graduation, i.e. they at the same time qualify for a higher level in the educational system. A skilled worker, for instance, can qualify for university, once he has completed the secondary technical school (Fachoberschule) and the polytechnic college (Fachhochschule). General education and vocational training complement each other in as much as both contribute - through broad general education and well-founded vocational training - in a significant way to the development of the Human Resources. The system of general education and vocational training in the Federal Republic of Germany is shown in Fig. 1.

Fig. 1: General education and vocational training in Germany

3. The dual system and its structure

In the Federal Republic of Germany, vocational training is a dual system in which industry, comparable institutions in particular of the public service, the professions and households (in-service training) cooperate with vocational schools and other (vocational) educational institutions outside the school and industrial sector. This is laid down in the Vocational Training Law (Berufsbildungsgesetz) of 1969, section 1, subsubsection 5. In this system, industry is responsible for the more practice-oriented elements of vocational training, while vocational schools provide the

required theoretical knowledge (cf. Fig. 2). The trainee thus has a dual role: he/she is a student and at the same time a trainee.

Fig. 2: Structure of the dual system (to Meyer-Dohm 1989, p. 12)

In the federal system, both the Federal Government and the Lõnder assume their specific responsibility for vocational training. While a federal act, the VOCATIONAL TRAINING LAW (1969) governs the in-plant training, the Lõnder are responsible for the curriculum at vocational schools.

3.1 The Vocational Training Law

The legal basis of the vocational training system is the VOCATIONAL TRAINING LAW of 1969, as passed by the Federal Parliament. This law sets forth the general conditions for the vocational training programme within industry and primarily governs

- the master/apprentice relationhship (substantiation, contents, commencement and termination of same) (ibid. part two),
- the regulations governing vocational training (persons authorized to take on and train trainees, recognition of trades requiring apprenticeship or other training), changes in the training period, list of master/trainee relationships, the examination rules, the regulation and supervision of vocational training, continuing training and retraining, and the vocational training of handicapped persons) (ibid. part three),
- the committees in the vocational training system (the federal committee, the länder committees, the committee for vocational training of the competent institution) (ibid. part four), and
- research in vocational training (ibid. part five).
- The Vocational Training Law also includes regulations for specific branches of industry or professional branches (ibid. part six), and in particular for vocational training in the craft trades (ibid. part one).

3.2 The training regulations

From the Vocational Training Law follow the training regulations. They are enacted by the competent Minister acting in agreement with the Federal Minister of Education and Science. The responsibility for jobs in trade and industry, including the craft industries, rests with the Economics Minister. Training regulations specify the exact designation of the trainee trades, the training period, the description of the trade (skills and knowledge, which form part of the vocational training programme), the basic training programme (guidelines for matter- and time-related structuring), and the examination requirements (cf. Vocational Training Law (1996), section 25 (2)).

Vocational training in the industrial metal working trades is based on the REGULATION FOR VOCATIONAL TRAINING IN INDUSTRIAL METAL WORKING TRADES (1987). It was passed after the metal working trades in industry had been reorganised, reducing the number of metal trades from 37 to 6, the 6 new trades representing 16 specific fields. The metal trades with their fields are shown in Fig. 3.

Fig. 3: Metal trades in industry (cf. DIHT 1986, p.4)

The training period is now limited to a standard 3.5 years (ibid., section 2(1)), the training programme itself being structured as follows:
In the first year, there is a basic training programme for the whole trade (ibid. section 3(1)). This means that for all the trades the same subjects are taught both at vocational schools and within the enterprises. In the second year, the technical training is the same for the two trainee trades of an industrial mechanic and a tool mechanic, as well as for the two trainee trades of a construction mechanic and systems mechanic; in the second half of that year, the technical training for these trainee trades is different. For the trainee trades of a cutting mechanic and an automobile mechanic, the technical training is differentiated according to trade in the second year (ibid., section 3(2)). For

the trainee trades that include specific fields, there is a specific technical training as from the third year (ibid. section 3(3)).

For the industrial electrical trades, the training programme is structured in a similar way. It is based on the REGULATION FOR VOCATIONAL TRAINING IN THE ELECTRICAL TRADES IN INDUSTRY AS WELL AS THE VOCATIONAL TRAINING FOR A COMMUNICATION ELECTRONIC ENGINEER OF THE GERMAN FEDERAL POSTAL ADMINISTRATION (1987).

3.3 Vocational training and its requirements

The contents of a vocational training programme is laid down by the relevant regulations. According to these, vocational training is to provide "in a well-structured training course a broadly based basic vocational education as well as the professional skills and knowledge required to practice a qualified trade. It also has to enable the student or trainee to acquire the required professional experience" (ibid. section 1(2)).

THE REGULATION FOR VOCATIONAL TRAINING IN INDUSTRIAL METAL WORKING TRADES (1987) sets forth the requirements for on-the-job training and stipulates - with regard to the VOCATIONAL TRAINING LAW (Section 2(1)) - that the trainee be enabled to practice a qualified trade, which includes in particular independent planning, execution of work and inspection. The contents or material presented shall be immediately related to the requirements of a specific trade or its specific field. Proof of the abilities or skills acquired shall be furnished in an examination (ibid. section 3(4)).

3.4 Access to vocational training

There are no specific access requirements for the dual system. It is left to the discretion of the training company and the trainee to decide whether or not he or she is suited for the trainee trade in question before signing a contract of traineeship. This contract would cover the total training period, including a trial period of three months. During this time, the contract can be cancelled by both parties without having to give any specific reason.

Even though there is no law requiring a specific number of years of school attendance before a trainee is able to sign a contract of traineeship, in general completion of the main school or Hauptschule (9th grade), which corresponds to the American junior high school, or of Realschule (10th grade), which corresponds to the American high school, is taken to be a basis. On the other hand there is an increasing number of people having reached the entrance level for university that first complete a training course before taking up their studies.

3.5 The vocational school as a training centre

It has been mentioned above that in the dual system the responsibility for imparting the required knowledge generally rests with the training company and the vocational school. Below it will first be shown how the syllabus at the vocational school is structured.

During his or her training, the trainee normally attends school once or twice a week. Another system is the so-called block release, where youths attend school for about 6 or 8 weeks, following which they resume training in their firm.

A trainee having started a training course is obliged to attend school when below the age of 24 years at the commencement of the course.

It is intended to offer trainees 12 hours of teaching per week at vocational school. If this can not be realised, it is due to a lack of teachers for specific subjects, which concerns in particular the fields of metal and electrical engineering.

The syllabus at vocational schools covers, on the one hand, such general subjects as religious instructions, politics, German and physical education. On the other hand there are the key subjects production and test engineering, materials science, mechanical engineering and instrumentation, technical communication, tools engineering, as well one optional subject. The syllabus covers a given number of hours per annum, which is 40 class hours in each subject, 100 class hours in tool engineering, and 80 class hours in the optional subject.

3.6 On-the-job training

Most of the time during a training programme is spent at the training company. Training is, however, not only provided at the job site. Especially big companies have their trainees both in training shops that are separated from the production process, and in in-plant courses.

The reasons for these companies to have transferred part of their in-plant training programme - which refers in particular to systematic instructions in major items - to training shops which, though located inside the operation, are independent of the production process, have to be seen in the division of labour and the automation level typical of large industrial enterprises.

Small- and medium sized businesses often had to set up special training shops in view of their high degree of specialisation, which without such training shops would not provide the broad basis in training the relevant regulations call for. For reasons of cost and capacity, these firms very often are not in a position to maintain their own workshops. Although this might have an effect on a firm's eligibility as a training shop, this disadvantage can (according to the Vocational Training Law or the Handicrafts Regulation Act) be compensated by ancillary training measures provided outside these enterprises.

From the above follows the mandate to be performed by interworks training centres (BMBW 1993). These centres are to complement the industrial share in the training programme under the dual system, so to speak as the training companies' extended workbench. The Chambers as the competent bodies can earmark specific items within the training programme that are to be covered by interworks training centres. Provisions to this effect may, however, also be included in the relevant training regulations.

While the interworks training programme is understood to be complementing the industrial training programme, off-the-job training replaces the latter. Examples for typical cases of off-the-job training are the "less-favoured" programme, or vocational training programmes for the disabled.

3.7 Final examinations in vocational training

Any vocational training will be completed by a final examination (cf. regulation for the vocational training in industrial metal working trades, 1987, Section 14). Such final examination covers the skills and knowledge specified in the relevant outline programme as well as the syllabus taught at the vocational school, to the extent to which same is of immediate relevance for the vocation training. Examinations are also to consider the ability of independent planning, execution of work and inspection.

Examinations extend over a maximum of 14 hours and include the preparation of two samples and two workpieces. Apart from the practical examination, there will be a written examination in the subjects technology, operations planning, technical mathematics as well as economic and social sciences.

The examination tasks will be set up for each examination and will be based on the aspects set forth by the relevant regulations. The responsibility for the actual form of the final examination rests with the competent institutions. For the metal and electrical trades in industry these are the Chambers of Industry and Commerce, while for the craft trades these are the Chambers of Handicrafts.

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The decisive participatory and decision-taking body of the competent institution is the vocational training committee. This committee is formed by six employees' representatives and six employers' representatives, as well as six teachers teaching at professional schools, the latter attending in an advisory capacity only. Since the examination rules are adopted by the vocational training committee for each examination date, they reflect current know how and up-to-date technical standards, which means at the same time that the training programme proper is organised in line with the requirements, if not of individual firms, but at least of the firms located within one specific region.

Section 14 of the model examination rules unanimously adopted by the federal committee for vocational training stipulates on the other hand that the examination committee of the competent institution also include into their examination programme examination tasks set up in a region other than the own region.

As a rule, the examination committees of the competent institutions follow these recommendations and use the tasks prepared centrally by a body which reports to the Baden-W_rttemberg Chamber of Commerce at Stuttgart and which is responsible for the development of examination tasks and teaching materials. Being prepared centrally, these tasks do not consider any regional requirements, but since employees' as well as employers' representatives contribute to the committees of this body they reflect the industry's changing needs.

4. Problems of technical training

While the previous section highlighted the structure and contents of the dual system of vocational training, now some of the problems this system has revealed during recent years will be illustrated, but it will also be shown how such problems have been taken account of.

Changes in the organisational structure of industrial enterprises have had their effect on the system of training. Fundamental questions were, moreover, raised by the fact that such enterprises are increasingly integrated into more global markets. These fundamental aspects will be outlined below.

4.1 The link between theory and practice

When briefly reflecting on what training for skilled labour meant in former times, it is found that it was first of all characterised by a very close master/apprentice relationship. Years of apprenticeship inevitably were years of travel, and these were an integral part of the training one had to pass. The emphasis then was on realising how a specific technical problem, at the same time a comprehensive task, is tackled by the master - what are the means and what is the experience the master can draw on? The model character and the comprehensive approach are the main elements of traditional training.

To have training located both in industry and at vocational schools gives rise to the problem of how best to match theory and practice especially when recognising that it is difficult to coordinate the school curricula with practical work in industry. This might suggest the conclusion that the entire programme should be concentrated at either a vocational school or the training company (or training centres).

The year of basic vocational instructions provided at schools already is such a type of school-based training. During the first year of training, there is a combination of theoretical and practical teaching, which is provided at vocational schools, thus offering for a complete trade the basic training in both the theoretical and the practical fields. The knowledge and abilities thus acquired are of a high technological standard. Starting from this basis, company-specific tasks can be solved. The advantage of this year of basic vocational instructions has to be seen in the fact that all trainees can reach the same standards, or in other words, differences in the facilities and possibilities the craft industries and industrial enterprises have to offer are smoothed.

One principal aim in training is to integrate trainees at a very early stage into an immediate order handling process. And here there is a direct connection with the historic model of the master/apprentice relationship and the comprehensive approach it lays claim to. An immediate job environment can be created both in the production line and in the technical centres provided for the respective training field, which calls for independent and responsible order handling.

4.2 Vocational and university education

The preference given to a university education rather than vocational training is reflected by a decreasing demand for traineeships in industry and trade, while the demand for university places is increasing (cf. Fig. 4). Affected by this serious downward trend is, however, not the commercial sector, where the demand for traineeships still exceeds the number of places actually available. This development is similar for any country where the social standard and the standard of education already are on a high level with a tendency to be raised.

Fig. 4: Development in the demand for university education versus vocational training

If occupations were graded according to their social standing, the actual trades would be found at the bottom of the list. A telling example is the difference in status within a company between blue- and white-collar workers, although under the collective bargaining law they are accorded the same treatment. In the academic sector, the same can be said for the difference between an engineer and a physician.

An analysis of this situation will have to consider on the one hand the attitude society has vis a vis technical products and, on the other, the workplaces at which same are produced. When turning to the situation at the workplace and the required qualifications, it is evident that conventional mass production following the Taylor system has produced jobs that are easy to learn and can be carried out by semi-skilled workers or experts possessing specific abilities. Such elements as giving shape, deciding and taking responsibility were replaced by an executing of operations, at the same time depreciating the qualifications of a skilled worker.

4.3 Changes in the organisation of work

Key industries are currently undergoing a restructuring process which is determined by new paradigms in the organisation of work. The main characteristic is a high degree of cross-links within an operation, while hierarchies tend to be "flat". This is to make the complexer structures within today's operations manageable by independent macro-systems acting on their own responsibility. As different units, which act as cost centres and can be compared to individual workshops, comprise a number of steps they provide for large-scale or extensive order handling and hence a comprehensive task. This means that activities gain not only in terms of quantity but also quality, implying also higher qualifications that are not only limited to technical competencies. The broad range of activities necessitates team work with an immediate exchange between the planning and producing sides. With a reduction in the vertical range of manufacture it can be expected that also small- and medium-sized companies will adopt this model, not least for reasons of quality.

When reverting once again to the question of a priority for vocational training at schools or at the job site, it appears that the changes taking place in the organisation of work cannot be reflected by school curricula. Levelled hierarchies and a consequential interlinked organisation of work will provide new perspectives also for the job of a skilled worker.

4.4 New methods in vocational training

In the light of technological developments and new structures of work organisation, the requirements made on the staff in the technical sector, too, take on new shapes. To be able to meet the rapid changes in qualification profiles, which themselves are a result of new technologies and new ways of work organisation, vocational training has included into its programme an approach centring around the development of key qualifications. These key qualifications are to provide a

skilled worker with the required means to master constantly new demands during his working life - which are flexibility and mobility. To arrive at adequate training strategies, a number of pilot schemes received official funding from the Federal Minister of Education and Science, assistance being provided by the federal institute for vocational training. These pilot schemes start from different descriptions of key qualifications. In this connection, the Siemens-based project and transfer-oriented training scheme PETRA (Projekt- und Transferorientierte Ausbildung) is of interest, where distinct qualifications are subsumed under five key qualifications (Klein 1990):

- organisation and execution of tasks
- communication and operation
- application of learning strategies, including mental strategies
- self-reliance and responsibility
- endurance.

To encourage the development of key qualifications, trainees are taken through a number of learning stages until the specific single qualification can be regarded as being mastered. To distinguish between the different stages of learning a taxonomy into

- reproduction
- reorganisation
- transfer
- solution of problem

as recommended by the Council for Education is used.

Unlike other countries, the Federal Republic of Germany has thus adopted a system where the development of key qualifications is tied to the vocational training programme. Through specific problems, a skilled worker can thus acquire interdisciplinary qualifications that are of significance for his career.

5. Training systems against the background of job skills

Different highly industrialised countries in Western Europe and the United States have arrived at different ways of organising vocational training (Blossfeldt 1993). This training is offered at different institutions and a dfferentiation can hence be made into training

- at schools providing a general education,
- at professional or technical schools,
- at interworks training centres,
- within a dual system
- in the form of on-the-job training.

Some countries concentrate on a specific type, while elsewhere a mixture of systems is preferred. In France, Luxembourg, Belgium, and to a certain extent also in the United States, training is provided at schools of a general education. Here, the emphasis is on the acquiring of theoretical knowledge. The on-the-job qualification practised in the United States, in the United Kingdom and in Italy, on the other hand, produces practical skills. Between these two models would be a system which combines theoretical and practical training with different points of emphasis. An example would be the technical secondary schools in the Netherlands.

When comparing these systems in respect of the development of flexibility and mobility, this has against three criteria:

- organisation and safeguarding of the theory/practice relationship
- standardisation of vocational training
- consistency.

When considering the dual system of vocational training against these criteria it will be found that they are all met. A purely school-based training cannot provide the theory/practice relationship, not

even by simulative elements. On-the-job qualification is a training for the workplace in question, without certificate and standards, and without providing sufficient reglementation.

The problem the dual system does present is the job structure. In this respect there is a contradiction to the requirement of flexibility, which an on-the-job qualification is more likely to meet. On the other hand, the dual system is not a static but a dynamic system. With the introduction of the year of basic vocational instructions it has been attempted in recent years to also include elements of other systems, thus optimising the dual system.

6. Summary

Being a major guarantor of high-quality products, the dual training system in the Federal Republic of Germany is an essential market parameter of the country's economy. But beyond that the dual system is also part of the growth policy as by improving the human capital - training in high-tech sectors - it will also help safeguard Germany's future as a major industrial nation. Training primarily takes place in handicraft and industrial enterprises and hence forms an integral part of the labour market and its regulatory instruments (principles of collective bargaining, protection against unlawful dismissal).

Major characteristics of the dual system are:

- reduced specialisation by a broadly-based basic education, starting from which is the technical training
- practice-oriented training and integrated theory, with the responsibility borne by industry and trade, the State, and trade unions
- a training directed at acquiring key qualifications through key contents, thus providing an adequate means of mastering structural changes
- standardised system with well-defined levels
- a planned changing over of youths from schools providing a general education to the training (and employment) system and vice versa (no dead-end careers).

There is no such thing as a system that cannot be improved. If it is to be successful and if it is to survive, vocational training will always have to take a bearing on the requirements of the workplace and the flexibility and mobility of people. That this is the course pursued is evident from the changes in training methods and methods of teaching. The worth of this system will become apparent when qualification certificates will be recognised on a European level and when there will be a higher degree of coordination between trade descriptions.

The future of the dual system in an international market also has to be seen from an economic viewpoint. The costs corporations incur for 3.5 years of training amount to approx. $ 40,000 (starting from a monetary parity of 1.70). Taking into account that a total of 40 million dollars have to be earmarked annually for about 3000 trainees, the cost/benefit ratio has to be considered in particular with a view of the international competitive situation.

7. Literature

Adler, Tibor; Dybowski, Gisela; Schmidt, Hermann: Kann sich das duale System behaupten? - Argumente für eine zukunftsorientierte Berufsausbildung. Berufsausbildung in Wissenschaft und Praxis 22 (1993) 1, pp. 3-10.

Bailey, Thomas: The Changing World of Work. VOC ED: New Directions Fall 1990

Blossfeldt, Hans-Peter: Die berufliche Erstausbildung Jugendlicher im internationalen Vergleich. Zeitschrift für Berufs- und Wirtschaftspädagogik: Beiheft 11. Entwicklungen in der Berufsausbildung. Edit.: P. Diepold et A. Kell. Stuttgart: Franz Steiner Verl., pp. 23-40

Die neuen Metall- und Elektroberufe. Edit.: Deutscher Industrie- und Handelstag (DIHT) u.a. Köln: Deutscher Instituts-Verl. 1986. (= Beiträge zur Gesellschafts- und Bildungspolitik. 121).

Georg, Walter; Kunze, Andreas: Sozialgeschichte der Berufserziehung. Eine Einführung. München: Juventa Verl. 1981 (= Studientexte Fernuniversität).

Klein, Ulrich (Edit.): PETRA. Projekt- und transferorientierte Ausbildung. Grundlagen, Beispiele, Planungs- und Arbeitsunterlagen. 2. wesentl. _berarb. u. erg. Aufl. Berlin, München: 1990

Meyer-Dohm, Peter: Unternehmensübergreifende Normierung des Ausbildungssystems. Ursache für ungenügende Anpassung an die technisch-ökonomische Entwicklung? Berufsbildung in Wissenschaft und Praxis (1989) 5, pp. 11-19.

Schmidt, Hermann: Internationale Aspekte der beruflichen Bildung. In: Berufliche Bildung im lernenden Unternehmen: Neue Wege zur beruflichen Qualifizierung. Edit.: P. Meyer-Dohm u. P. Schneider. Stuttgart, Dresden: Ernst Klett Verl. für Wissen und Bildung 1991, pp. 227-236

Stratmann, Karlwilhelm; Schlösser, Manfred: Das duale System der Berufsbildung. Eine historische Analyse seiner Reformdebatten. Gutachten für die Enquete- Kommission "Zukünftige Bildungspolitik - Bildung 2000" des Deutschen Bundestages. Frankfurt am Main: Verlag zur Förderung arbeitsorientierter Forschung und Bildung 1990.

Überbetriebliche Berufsbildungsstätten: Entwicklung, Aufgabe, Perspektiven. Edit.: Bundesministerium für Bildung und Wissenschaft. Bonn: BMBW 1993 (= Schriftenreihe Grundlagen und Perspektiven für Bildung und Wisssenschaft. 35).

Womack, James P.; Jones, Daniel T.; Roos, Daniel: Die zweite Revolution in der Automobilindustrie. Konsequenzen aus der weltweiten Studie des Massachusetts Institute of Technology. Frankfurt/Main, New York: Campus Verl. 1992.

Laws and regulations

Berufsbildungsgesetz (BBiG) vom 14. August 1969. Bundesgesetzblatt, Teil I, p. 1112 ff.

Berufsbildungsgesetz. Schriftenreihe Wirtschaft und Berufsbildung. Bielefeld 1969.

Das Niedersächsische Kultusministerium: Richtlinien für den berufsfeldbezogenen Unterricht im Berufsgrundbildungsjahr Metalltechnik. Hannover: Berenberg'sche Druckerei GmbH und Verlag 1990.

Niedersächsisches Schulgesetz (NSchG) in der Fassung der Bekanntmachung vom 6. November 1980. Nieders. GVBL. p. 425.

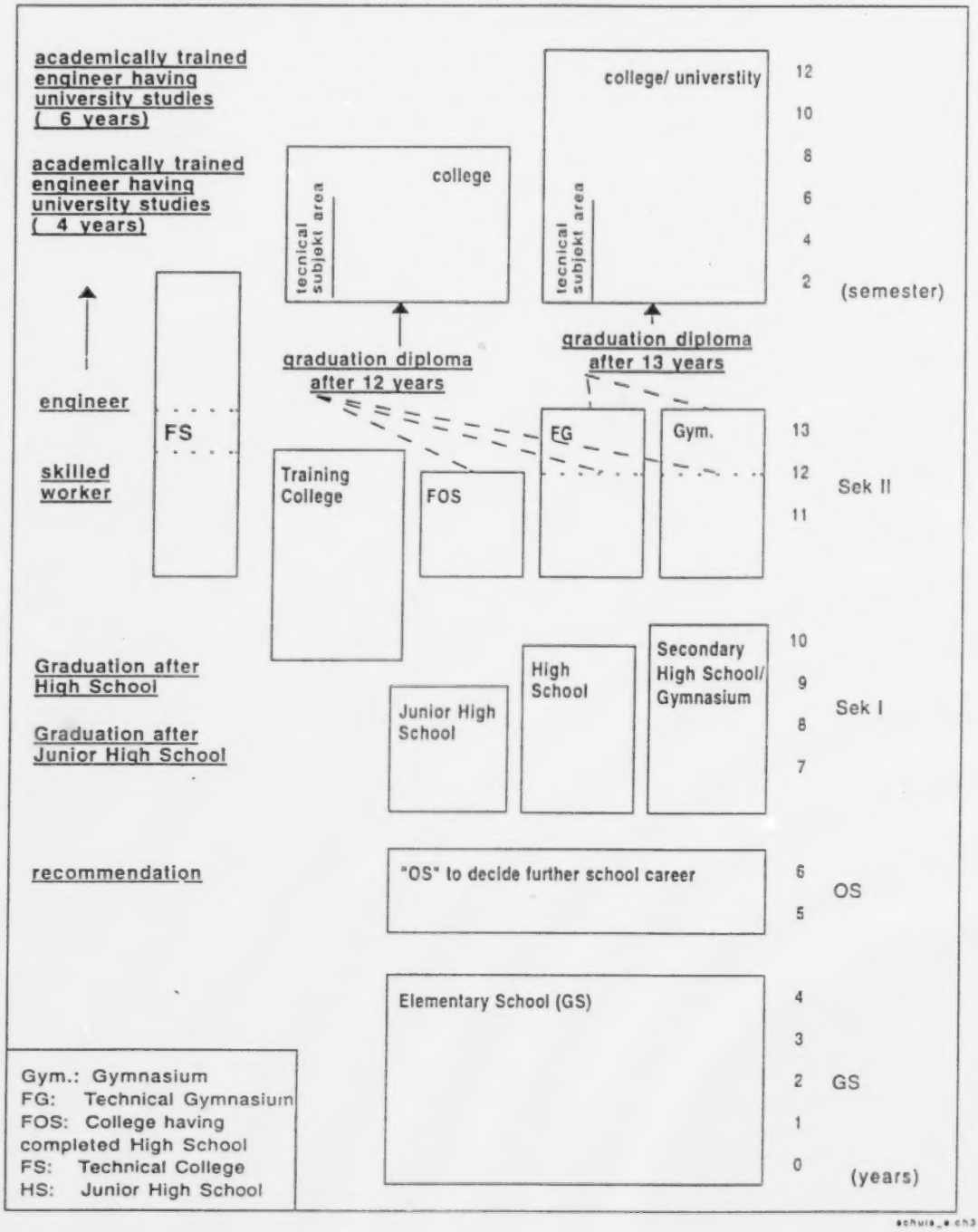
Rahmenlehrpläne für die Berufsausbildung in den industriellen Metallberufen Industriemechaniker/Industriemechanikerin, Werkzeugmechaniker/Werkzeugmechanikerin, Zerspanungsmechaniker/Zerspanungsmechanikerin, Konstruktionsmechaniker/Konstruktionsmechanikerin, Anlagenmechaniker/Anlagenmechanikerin, Automobilmechaniker/Automobilmechanikerin (Beschluß der Kultusministerkonferenz vom 7. Januar 1987). Bielefeld: W. Bertelsmann Vlg. um 1987.

Rahmenvereinbarung über die Berufsschule (Beschluß der Kultusministerkonferenz vom 14./15.3.1991). Ed.: Sekretariat der Ständigen Konferenz der Kultusminister der Länder in der Bundesrepublik Deutschland. Bonn 1991.

Verordnung über die Berufsausbildung in den industriellen Elektroberufen und zum Kommunikationselektroniker/zur Kommunikationselektronikerin im Bereich der Deutschen Bundespost vom 15. Januar 1987 (Bundesgesetzblatt Teil I p. 274 vom 24. Januar 1987). Bielefeld: W. Bertelsmann Vlg. um 1987.

Verordnung über die Berufsausbildung in den industriellen Metallberufen Industriemechaniker/Industriemechanikerin (Industrielle Metall-Ausbildungsverordnung - IndMetAusbV) mit Ausbildungsrahmenplan für die Fachrichtung Produktionstechnik vom 15. Januar 1987 (Bundesgesetzblatt Teil I p. 274 vom 24. Januar 1987). Bielefeld: W. Bertelsmann Vlg. um 1987.

Technical Education and the Connection to the System of Education



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Universität Hildesheim

GERMAN SYSTEM OF VOCATIONAL EDUCATION
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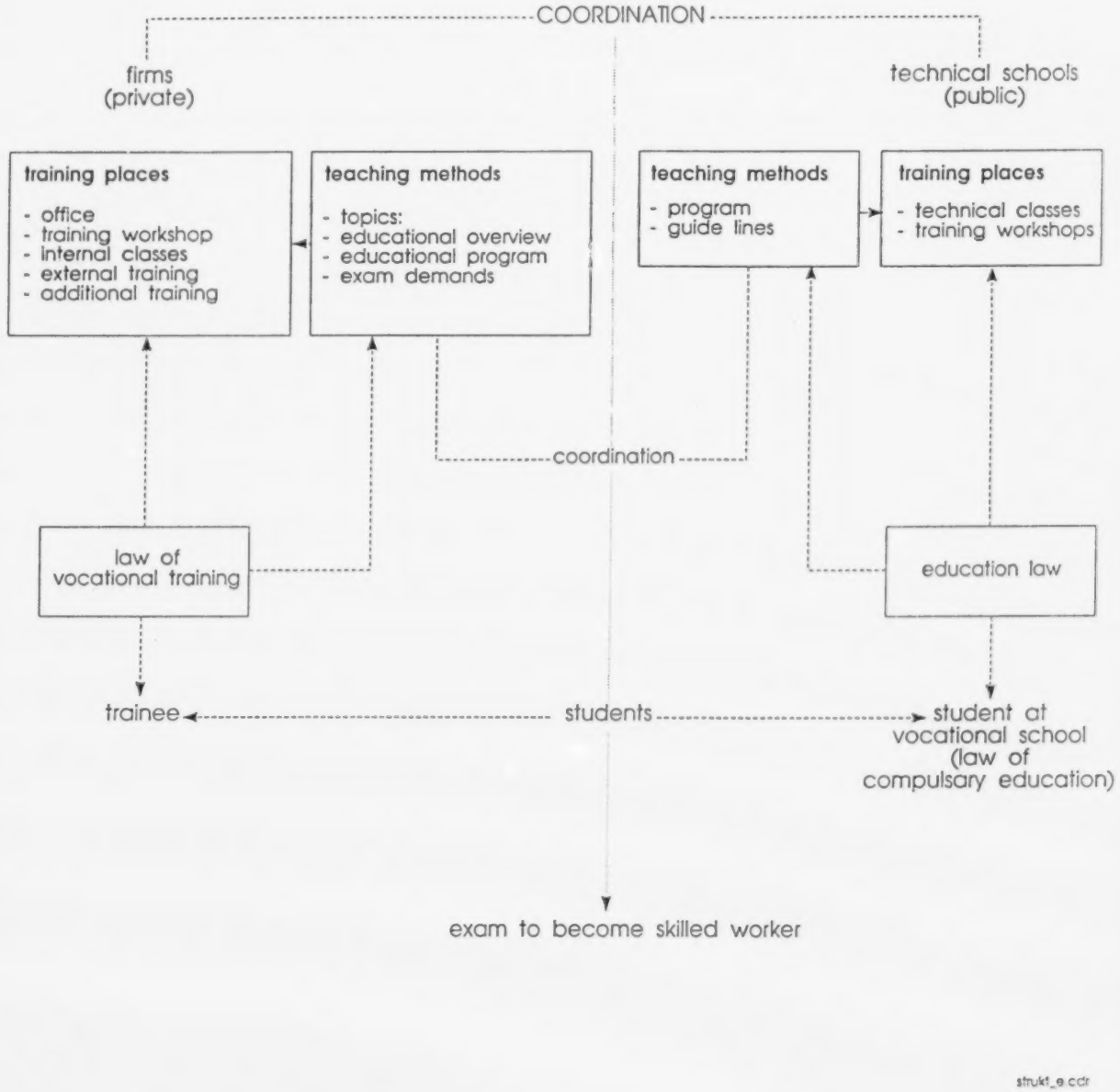

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